

Deviation from the normal course Algué explains as usually due to the presence not far away of another typhoon. However, there is record of a hurricane in Fiji which recurved so sharply on its course that its center passed twice over the city of Levuka, and yet no other disturbance was known to be anywhere near. Furthermore, this hurricane traveled northwest from Levuka after its first passage over that city, the opposite direction from that which tropical cyclones normally take in that latitude in the southern hemisphere.<sup>27</sup>

*Bifurcation of cyclones.*—Sometimes it happens that a well-developed cyclone apparently divides into two independent, comparable storms, each of which henceforth follows an independent course. Algué suggests that topographic barriers may be the cause, but the cases he considers do not make this explanation altogether satisfactory.

Secondary whirls sometimes develop within a cyclone, producing destructive winds far from the center of the main cyclone. Algué has repeatedly observed such secondary centers in the Philippines. Doctor Okada reports that two or three secondary centers sometimes occur within a typhoon.

*Typhoons and mountains.*—It is stated in some standard meteorologies that tropical cyclones can not cross a mountain range 3,000 feet high. This is often disproven in the Far East, for typhoons sometimes cross mountains of greater height than this in Taiwan (Formosa), in the Philippines, in Japan, and elsewhere. Mountainous Formosa often appears to deflect typhoons which approach it at a small angle, and sometimes cuts the typhoon in two, according to Froc, but, on the other hand, other storms clearly cross it with no apparent regard for its mountains, the highest of which reach over 13,000 feet. Doctor Okada reports that studies made on lofty Fuji, near Yokohama, and on the higher mountains of Formosa indicate the depth of most typhoons to be approximately 5 or 6 kilometers (16,000 to 20,000 feet).

Although it is commonly stated that typhoons weaken decidedly as soon as they come upon the land, both Froc and Okada have observed many cases where this was not true in southeast China, the typhoons maintaining most of their force until encountering lofty mountains.

#### THE CHANGING ARCTIC.

By GEORGE NICOLAS IFFT.

[Under date of October 10, 1922, the American consul at Bergen, Norway, submitted the following report to the State Department, Washington, D. C.]

The Arctic seems to be warming up. Reports from fishermen, seal hunters, and explorers who sail the seas about Spitzbergen and the eastern Arctic, all point to a radical change in climatic conditions, and hitherto unheard-of high temperatures in that part of the earth's surface.

In August, 1922, the Norwegian Department of Commerce sent an expedition to Spitzbergen and Bear Island under the leadership of Dr. Adolf Hoel, lecturer on geology at the University of Christiania. Its purpose was to survey and chart the lands adjacent to the Norwegian mines on those islands, take soundings of the adjacent waters, and make other oceanographic investigations.

Dr. Hoel, who has just returned, reports the location of hitherto unknown coal deposits on the eastern shores of Advent Bay—deposits of vast extent and superior quality. This is regarded as of first importance, as so far most of the coal mined by the Norwegian companies on those islands has not been of the best quality.

The oceanographic observations have, however, been even more interesting. Ice conditions were exceptional. In fact, so little ice has never before been noted. The expedition all but established a record, sailing as far north as 81° 29' in ice-free water. This is the farthest north ever reached with modern oceanographic apparatus.

The character of the waters of the great polar basin has heretofore been practically unknown. Dr. Hoel reports that he made a section of the Gulf Stream at 81° north latitude and took soundings to a depth of 3,100 meters. These show the Gulf Stream very warm, and it could be traced as a surface current till beyond the 81st parallel. The warmth of the waters makes it probable that the favorable ice conditions will continue for some time.

Later a section was taken of the Gulf Stream off Bear Island and off the Isfjord, as well as a section of the cold current that comes down along the west coast of Spitzbergen off the south cape.

In connection with Dr. Hoel's report, it is of interest to note the unusually warm summer in Arctic Norway and the observations of Capt. Martin Ingebrigtsen, who has sailed the eastern Arctic for 54 years past. He says that he first noted warmer conditions in 1918, that since that time it has steadily gotten warmer, and that to-day the Arctic of that region is not recognizable as the same region of 1868 to 1917.

Many old landmarks are so changed as to be unrecognizable. Where formerly great masses of ice were found, there are now often moraines, accumulations of earth and stones. At many points where glaciers formerly extended far into the sea they have entirely disappeared.

The change in temperature, says Captain Ingebrigtsen, has also brought about great change in the flora and fauna of the Arctic. This summer he sought for white fish in Spitzbergen waters. Formerly great shoals of them were found there. This year he saw none, although he visited all the old fishing grounds.

There were few seal in Spitzbergen waters this year, the catch being far under the average. This, however, did not surprise the captain. He pointed out that formerly the waters about Spitzbergen held an even summer temperature of about 3° Celsius; this year recorded temperatures up to 15°, and last winter the ocean did not freeze over even on the north coast of Spitzbergen.

With the disappearance of white fish and seal has come other life in these waters. This year herring in great shoals were found along the west coast of Spitzbergen, all the way from the fry to the veritable great herring. Shoals of smelt were also met with.

#### BIRDS STORM-SWEPT OVER THE NORTH ATLANTIC OCEAN.

By WILLIS E. HURD.

[Weather Bureau, Washington, D. C., Dec. 10, 1922.]

An interesting memorandum was recently received by the Weather Bureau in connection with a marine weather report from Mr. W. Scott, fifth officer of the American S. S. *Manchuria*. It deals with the appearance of several varieties of small land birds a considerable distance at sea on the 27th to 29th of October, 1922, during a voyage from New York to Hamburg, and is presented here, with an inclusion of the list of observed bird varieties, for the scientific interest involved.

S. S. *Manchuria*,  
Voyage 50—N. Y.—HAMBURG,  
October 28, 1922.

It may be of some interest to the Department of Plants and Animals or to the Smithsonian Institution to note that on October 27, latitude 40° 36', longitude 66°, to noon 28th, latitude 41° 45', longitude 59° 27',

<sup>27</sup> R. L. Holmes: Quart. Journ. Royal Meteorol. Soc., January, 1905.

several hundred birds alighted on the ship, having been blown to sea by a strong northwest breeze, evidently as they were migrating south.

The following varieties were noted:

Robins, 6 or more.

Starlings, several.

Thrushes, several.

Catbird, one seen.

Flicker, or yellow hammer, one seen.

Ground, or vesper, sparrows, many.

Bluebirds, several.

Small birds with mixed greenish feathers, like flycatchers, smaller than sparrows, many.

Small dove-colored birds size of sparrows, many.

Brown sparrows, trifle larger than English sparrows.

Birds size of sparrows with two white feathers in tail, possible snow-birds, many.

Birds a little larger than sparrows with much white on wings and back, a variety which kept well together, not seen around New York City, 12 or more.

At the time these birds began to alight on the ship, there seemed to be many more on the sea, and I have no doubt thousands of birds are lost each year during the migrating season in strong offshore breezes.

The birds are dying rapidly or fail to "make the ship" again, though on Sunday (29th) there were light airs, and many of the smaller birds and several robins are still with us.

Doubtless all will be blown to sea in the first gale and perish.

It is quite possible the ornithological societies may be well aware of loss of birds along the coast, but I have never seen it mentioned, though a "bird lover," in any article on the subject.

Aside from the facts in this communication, a press report contains an account of a similar visitation on board the Cunard liner *Scythia* on her trip from New

York to Liverpool, beginning October 26. When about 400 miles from the American coast, an extraordinary gathering of birds, estimated to be many thousands in number, settled on the steamer's deck and rigging. They included many types of small birds, as well as a few owls. Great numbers remained on board throughout the voyage.

During this period a storm of considerable intensity prevailed in the neighborhood, being central over the Canadian maritime provinces. On the afternoon and evening of the 26th moderate to strong northwesterly gales were prevalent from New York City and the vicinity eastward, and on the 27th fresh to whole gales from some westerly direction swept a large sea area south and east of Nova Scotia.

This extratropical cyclone, then, may be assigned as having caused the presence of so great a number and variety of birds in a locality far out of their ordinary range of activity. From their numbers the conclusion that they were migrant birds enroute for the southland when swept to sea seems well grounded.

Similar dispersals by the wind are constantly taking place, though perhaps somewhat rarely on so large a scale. The West Indian hurricanes, for instance, carry away many birds and insects when the paths lie over land.

#### MOSSMAN ON THE PHYSICAL CONDITION OF THE SOUTH ATLANTIC DURING SUMMER.

By H. HELM CLATYON.

[1292 Washington Street, Canton, Mass.]

In the monthly bulletin of the Argentine Meteorological Office there is an interesting study of "The Physical Condition of the South Atlantic during Summer," by Robert C. Mossman.<sup>1</sup> This study of Mr. Mossman was intended chiefly as a study of the observations made by the relief ship going to and fro between Buenos Aires and the Orcadas (South Orkneys) sent by the Argentine Government each year to carry a party of new observers and to bring back the observers of the previous year from the most southern meteorological station in the world, which has been maintained by the Argentine service since 1903. With characteristic thoroughness, Mr. Mossman has combined these data with all the accessible data for that region and produced a valuable study of the South Atlantic during the summer between latitudes 40° and 60° S. and longitudes 40° and 70° W. The summer for that region is December, January, and February.

He first works out the normal distribution of pressure for the summer. His charts show the well-known centers of high pressure over the oceans at about 30° S. They show also two centers of low pressure near the Antarctic circle, one over Weddell Sea and another to the west of Graham Land, separated by a tongue of higher pressure stretching northward from the Antarctic Continent over Graham Land.

This distribution of pressure furnishes a key to the prevailing winds which are shown by windroses drawn for each 5° square and for each month separately from December to March. The wind frequencies are indicated by the lengths of the arrows and the frequencies

of gales from each direction are indicated by the proportions of the arrows shaded.

In an additional chart the fog frequencies are shown for each wind direction during the interval January to March.

In every chart Graham Land is seen to be a windshed dividing the winds which circulate about the low pressure in Weddell Sea and the low pressure to the west of Graham Land. On the west side of Graham Land there is a distinct maximum of northeast winds in summer, while on the east side the prevailing winds are from south and southwest.

In regard to the fogs in that region he says: "When a warm wind blows over cold water, the fog is generally very dense near the surface of the water, but has very little height and occasionally it is possible to see over it from the masts of a ship. On the contrary, when a fog is produced by the passage of a cold wind over water at a higher temperature the fog extends to much greater heights, but the base does not always reach the earth's surface; so that the visibility from the deck of a ship is very different in the two cases."

The curve of frequency of fog for each hour at the Orcadas shows a maximum frequency between 8 p. m. and midnight and a minimum frequency at 2 p. m.

In examining water temperatures he found very marked falls of temperature between about 48° and 50° south latitude and finds its explanation in the sharp contrast between the Brazilian Current and the Antarctic Current, which meet about those latitudes.

A diagram is given showing the duration of ice for each year at the Orcadas from 1903 to 1920, and a closing chart is given showing the extreme northern limit of floating icebergs and the line of greatest density of icebergs in so far as they have been observed.

<sup>1</sup>Las condiciones físicas del Atlántico sur entre el Río de la Plata y las islas Orcadas del sur durante el verano Boletín Mensual, Año IV, N.º 5, Mayo de 1919, Oficina Meteorológica Nacional, Buenos Aires, 1922.